NH Department of Safety
Homeland Security & Emergency Management

Air Regulations Pertaining to Emergency Generators located at Area Sources

Cathy Beahm
Technical Assistance Specialist
NH DES, Air Resources

Presentation Overview

- Air emissions from emergency generators
- Federal Regulations
  - New Source Performance Standards
  - National Emission Standards for HAPs
- State Regulations
  - Permitting Applicability
  - Types of Permits
- Questions

Emissions from Emergency Generators

- Criteria Pollutants
  - Nitrogen Oxides (NOx)
  - Carbon Monoxide (CO)
  - Sulfur Dioxide (SO_2)
  - Particulate Matter (PM)
  - Volatile Organic Compounds (VOC) or Non-methane hydrocarbons (NMHC)
- Hazardous Air Pollutants

Federal Regulations

Overview of recent EPA actions affecting emergency generators

- NSPS for Stationary Compression Ignition (CI) Internal Combustion Engines (40 CFR 60, Subpart IIII) (“Quad I”)
- NSPS for Stationary Spark Ignition (SI) Internal Combustion Engines (40 CFR 60, Subpart JJJJ) (“Quad J”)
- NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) (40 CFR 63, Subpart ZZZZ) (“Quad Z”)

How do these three rules compare?
(Information is for comparison purposes only)

Regulation	Fuel Type	Manufacture Date of Engine[1]	Pollutants Regulated
Quad I	Diesel	Beginning in model year 2007 and later	NOx, PM, CO, NMHC SO_2
Quad J	Gasoline	Beginning in model year 2007 and later	NOx, PM, CO, NMHC SO_2
Quad Z	Both fuels	All engines	HAPs

[1] Manufacture date varies with size of engine. See rule for more accurate information on the dates.

NSPS for Stationary CI Internal Combustion Engines ("Quad I")

- Who is subject to Quad I?
- Manufacturers of 2007 model year or later stationary CI engines <30 liters/cylinder displacement
  - Model years differ for fire pump engines (2008-2011 depending on size)
- Owners/operators of engines
  - Constructed (ordered) after 7/11/2005 and manufactured after 4/1/2006
  - Constructed after 7/1/2006 for fire pump engines
  - Modified/reconstructed after 7/11/2005

Quad I - Emission Standards

- Phased in over several years and have Tiers with increasing levels of stringency
- Output-based, units of g/kW-hr (g/HP-hr)
- Pollutants: NOx, PM, CO, NMHC
- SOx reduced through use of low sulfur fuel
- Modeled after EPA's standards for non-road and marine engines

Quad I - Compliance

- Manufacturers must certify 2007 model year and later engines with a displacement <30 liters/cylinder
  - Certification = EPA Certificate of Conformity
- Owner/operator of emergency generators complies by:
  - Purchasing certified engine
  - Install, configure, operate and maintain engine per manufacturer's instructions or manufacturer-approved procedures
  - Install a non-resettable hour meter prior to startup
  - Owner/operator operates unit with **ultra low sulfur fuel** after October 1, 2010 (<15 ppm sulfur content)

Power Generation

EPA Tier 3 Exhaust Emission Compliance Statement

200DSHAC

60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA and California emission regulations under the provisions of 40 CFR 89, Nonroad (Mobile Off Highway) Tier 3 emissions limits when tested per ISO 8178 D2.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	CEX-NRCI-08-38
Effective Date:	12/04/2007
Date Issued:	12/04/2007
EPA Nonroad Diesel Engine Family:	8CEXL0540AAB
CARB Executive Order:	U-R-002-0449

Engine Information:

Model:	Cummins Inc. QSL9-G2 NR3	Bore:	4.49 in. (114 mm)
Engine Nameplate HP:	364		
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Stroke:	5.69 in. (145 mm)
Aspiration:	Turbocharged and CAC	Displacement:	543 cu. in. (8.9 liters)
Compression Ratio:	16.8:1		
Emission Control Device:	Turbocharged and CAC		

U.S. Environmental Protection Agency Nonroad Tier 3 Limits

COMPONENT	(All values are Grams per HP-Hour)
NOx + HC (Oxides of Nitrogen as NO2 + Total Unburned Hydrocarbons)	3.0
CO (Carbon Monoxide)	2.6
PM (Particulate Matter)	0.15

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Quad I - Notification and Recordkeeping

- Emergency Generators not required to submit an initial notification.
- Maintain **documentation** from the manufacturer certifying that the engine complies with the applicable emission standards of Quad I
- Record the **time of operation** of the engine and the **reason** the engine was in operation during that time.
- Keep records of the **sulfur content** of the fuel burned in the device.

NSPS for Stationary SI Internal Combustion Engines ("Quad J")

Which Emergency Generators are Subject to Quad J?

- Stationary SI engines used as emergency generators that were manufactured after January 1, 2009

Quad J - Emission Standards

- Phased in over several years and have Tiers with increasing levels of stringency
- Output-based, units of g/kW-hr (g/HP-hr)
- ppmvd@15% O_2, standards for some engines
- Pollutants: NOx, CO, VOC
- Sulfur limit on gasoline
- Some standards modeled after EPA's standards for non-road SI engines

Quad J - Compliance

- Manufacturers must certify engines ≤25 HP, gasoline engines, and rich burn LPG engines
- Manufacturers can elect to certify other engines
- Owner/operator complies by either:
  - For certified engines: Install, configure, operate and maintain engine per manufacturer's instructions or manufacturer-approved procedures
  - For uncertified engines: Conduct performance test (requirements vary depending on engine size)

Quad J - Notification and Recordkeeping

- Owners/operators of uncertified SI RICE ≥500 HP must submit an initial notification.
- Owners/operators of all SI RICE must keep records of:
  - All notifications
  - All maintenance conducted on the engine
  - For certified engines: Documentation from the manufacturer certifying that the engine complies with the applicable emission standards of Quad J
  - For uncertified engines or certified engines operating in a non-certified manner: Documentation that the engine meets the emission standards.

NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) ("Quad Z")

- New or reconstructed (after 6/12/2006) stationary RICE located at an area source must meet the requirements of Quad I or Quad J. No further requirements apply under Quad Z.
- Existing (prior to 6/12/2006) **residential, commercial, and institutional** emergency stationary RICE located at an area source of HAP emissions do not have to meet the requirements of Quad Z or the General Provisions of 40 CFR 63 including initial notifications provided they do not participate in Emergency Demand Response programs.

NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) ("Quad Z") continued

- Existing (prior to 6/12/2006) emergency stationary RICE located at an area source of HAP emissions shall (beginning May 3, 2013):
  - Install non-resettable hour meter;
  - Change oil and filter annually;
  - Inspect air cleaner, hoses and belts annually;
  - Minimize idle time during startup and minimize startup time to a period needed for appropriate and safe loading, not to exceed 30 minutes; and
  - Operate and maintain the engine according to manufacturer's emission-related operations and maintenance instructions.

State Regulations

Statutory Requirements

- RSA 125-C:11 "The construction, installation, operation, or modification of any device, non-Title V source or affected source as defined under RSA 125-C:2 and as further defined by rules adopted by the commissioner shall be prohibited unless the source possesses a temporary permit or operating permit whether a permit-by-notification, general permit, or an individual operating permit issued by the commissioner…"
- Env-A 600 *Statewide Permit System*

What size engine requires an air permit?

Device	Design gross heat input (BTU/hr)		Fuel
	Individual	Combined	
One or more Internal Combustion Devices (Engines)	150,000	1,500,000	Liquid fuel oil (diesel)
	1,500,000	10,000,000	NG or LPG

or

and

Examples:

(1) Caterpillar C27 Engine rated 750 kW [1141 hp; 53.5 gal/hr diesel]
Assuming 137,000 Btu/gal; 750 kW = 7,329,500 Btu/hr

(2) Kohler 25RZGB Engine rated 25 kW [40 hp; 166cfh LPG]
Assuming 90,500 Btu/gal and 100 cubic feet propane = 2.78 gallons
25 kW = 417,640 Btu/hr

Types of Permits

- **General State Permit for Emergency Generators**
  - DES re-establishes the GSP every 5 years (up for renewal in April, 2015)
  - Facilities register to operate according to the re-established permit
  - Online Air E-Permitting or paper application forms
  - Easy, fast, less paperwork
  - GSP Registration Fee (prorated based on initial application date)
- **Individual Permits (Temporary, State)**

Application Forms

- DES website:
  - http://des.nh.gov/ (Main Page)
  - http://des.nh.gov/onestop/air-epermitting.htm (Air E-Permitting)
  - http://des.nh.gov/organization/divisions/air/pehb/apps/categories/forms.htm (Paper Forms)
  - General State Permits: ARD-1 and GSP-2
- On-line permitting:
  - Step 1 – Become a OneStop Provider
  - Step 2 – Register on-line for General State Permit
- Temporary and State Permits to Operate: ARD-1 and ARD-2

Questions?

Contact:

N.H. Department of Environmental Services
Air Resources Division

Cathy Beahm

catherine.beahm@des.nh.gov

(603) 271-2822

or

Barbara Dorfschmidt

barbara.dorfschmidt@des.nh.gov

(603) 271-6796